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that the product of the distances that *A* and *C* traveled north and south *plus* the square of the difference *squared*, plus the product multiplied by the square of the difference, was 49410000 [equal to the following new formulas:

$(nn+d^2+1)=3901$, and $\{(nn+d^2)^2+(nn \times d^2)\}=49410000$]. How far on a line is each party from the starting place, and how long did it require for *B* and *D* each to make the entire trip from starting place to the end?

[The Proposer says: "A city lot at St. Andrews, Florida, will be given to the party sending the EDITOR the first correct answer to the above problem-No. 43].

GEOMETRY.

Conducted by B. F. FINKEL, Kidder, Mo. All contributions to this department should be sent to him.

SOLUTIONS TO PROBLEMS.

25. Proposed by L. B. FRAKER, Weston, Ohio.

The sides of a quadrilateral board are $AB=7$ inches, $BC=15$ inches, $CD=21$ inches, and $DA=13$ inches; radius of inscribed circle is 6 inches. (1) What are dimensions of the largest rectangular board that can be cut out of the given board, (2) largest square, (3) largest equilateral triangle? (Please solve without use of the calculus.)

II. Solution by Professor G. B. M. ZERR, A. M., Principal of High School, Staunton, Virginia.

From the solution of this problem on page 354, No. 10, Vol. I, we find for another set of values for the angles, $A=112^\circ 37' 11''$, $B=126^\circ 52' 12''$, $C=53^\circ 7' 38''$, $D=67^\circ 22' 49''$. This demonstrates that AB and CD are parallel. Since CD is the longest side and also parallel to AB , one side of the rectangle and square will coincide with DC . Let KI and HI be the sides of the rectangle.

Then $\frac{1}{2}(AB+DC) \times EF = KI \times HI + \frac{1}{2}(AB+KI)(EF-HI) + \frac{1}{2}HI(DK+IC)$.

$$\therefore \frac{1}{2}(7+21) \times 12 = KI \times HI + \frac{1}{2}(7+KI)(12-HI) + \frac{1}{2}(HI)(21-KI).$$

$$\therefore 126 = 6KI + 7HI. \text{ For a maximum } 6KI = 7HI.$$

$$\therefore HI = 9 \text{ inches, } KI = 10\frac{1}{2} \text{ inches.}$$

$\therefore GHIK$ is the rectangle.

For the square $KI = HI$.

$$\therefore 126 = 13KI, \therefore KI = 9.692 + \text{inches.}$$

$\therefore LMNP$ is the square.

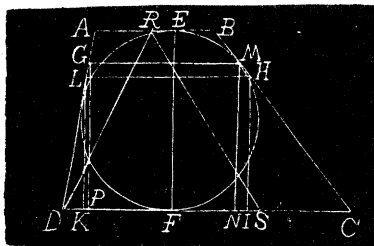
For the triangle, draw DR making the angle $RDC = 60^\circ$.

$$\text{Then } DR^2 = EF^2 + \frac{1}{4}DR^2.$$

$$\therefore \frac{3}{4}DR^2 = 144, DR^2 = 192,$$

$$DR = 13.856 \text{ inches.}$$

$\therefore DRS$ is the triangle.



The above solution is the result of suggestions from the Proposer.